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Conference Abstract

Exploring Skeletal Preparation Techniques: Recuration of Botswana Mammals from a 1969 Expedition Using Tergazyme™

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Abstract

We explored the efficiency of Tergazyme™ bone cleaning techniques to recurate mammalian skeletal material from a 1969 expedition to Botswana, in Southern Africa. Mr. J.D. Putnam and colleagues shot and killed over 400 specimens during this expedition, bringing them back as trophies. These skeletal materials and skins of these specimens have remained in the collections at Denver Museum of Nature and Science (DMNS), after haphazard preparation with pesticides such as dichloro-diphenyl-trichloroethane (DDT) and negligent soft tissue removal. Many of the skulls and post-cranial materials are coated with dessicated muscle and other connective tissues, including cartilage around the turbinate bones, and most of the soft tissue remains on the surface of the hard palate. These materials continue to emit noxious fumes permeating even the protective archival plastic and cardboard within which they had been temporarily stored. Recuration of these specimens needs to consider the safety of the preparator and other volunteers, and the fragile state of skull and post-cranial materials in DDT for nearly five decades.

Tergazyme™ is a concentrated detergent used to remove protein and other biological tissues from medical instruments (Alconox, Inc. 2006). This detergent isauthorized by the United States Department of Agriculture (USDA), biodegradable, and uses a protease

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enzyme from the bacterial organism *Bacillus licheniformis*, which produces enzymes commonly used for industrial purposes. Though Tergazyme™ is widely used at a dilution of 1:100, for cleaning medical instruments, we found that an aqueous solution with smaller dilution factors combined with heat and manual agitation (using a stirring rod or other circulating tool) was able to soften the tough dessicated tissues from skulls and post-cranial materials of many different specimens. We removed elements from the macerating solution approximately every two to five days (depending on size) and used dental tools and brushes, rinsing with water, to complete the cleaning of the bones. Throughout the summer of 2017, we cleaned and recurated osteological materials from a dozen specimens, including the groups *Acinonyx, Crocuta, Genetta, Hyaena, Ichneumia, Lycaon, Panthera*, and *Proteles.* Besides the benefit of making these materials available and safe for researchers to use, this project revealed pre-mortem bone pathologies in a lion *Panthera leo* that were previously invisible under dessicated flesh. In addition to their physical availability, digital before and after images will be made available via collection management information system, Arctos. Discoveries such as these can also be compared to more recent specimens for longitudinal pathological studies.

Keywords

skeletal preparation, maceration techniques, recuration, Botswana, Tergazyme™

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Hosting institution

This project took place at Denver Museum of Nature & Science.

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